

Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the applications:

1. (Previously amended) An apparatus to perform semiconductor processing, comprising:
a process chamber;
a plasma generator that can generate a plasma in the process chamber; and
a helical ribbon electrode coupled to an output of the plasma generator, wherein the electrode comprises a plurality of ribbon coils configured as stacked flat concentric spirals, each said ribbon coil having a width and a thickness, said width being greater than the thickness, said width being substantially perpendicular to the thickness, and said width being in a dimension facing an adjacent coil.
2. (Original) The apparatus of claim 1, wherein the helical ribbon electrode is external to the process chamber.
3. (Original) The apparatus of claim 2, further comprising a dielectric wall position between the chamber and the helical ribbon electrode.
4. (Original) The apparatus of claim 3, wherein the dielectric wall is a flat plate.
5. (Original) The apparatus of claim 3, wherein the dielectric wall is concave.
6. (Original) The apparatus of claim 3, wherein the dielectric wall is convex.
7. (Original) The apparatus of claim 3, wherein the dielectric wall is a tube.
8. (Original) The apparatus of claim 7, wherein the dielectric wall projects through the center of the helical ribbon electrode.
9. (Original) The apparatus of claim 1, wherein the helical ribbon electrode is internal to the process chamber.

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10. (Original) The apparatus of claim 1, wherein the apparatus is adapted to receive a workpiece in the chamber and wherein the distance between the helical ribbon electrode and the workpiece is less than five inches.
11. (Previously amended) The apparatus of claim 1, wherein the apparatus is adapted to receive a workpiece in the chamber and wherein the distance between the helical ribbon electrode and the workpiece is approximately one to three inches.
12. (Original) The apparatus of claim 1, wherein the plasma generator pulses the helical ribbon electrode to perform pulse processing.
13. (Original) The apparatus of claim 1, further comprising a controller coupled to the control input of the plasma generator to control the generation of the plasma.
14. (Previously amended) The apparatus of claim 1, wherein the plasma generator is a radio frequency plasma generator.
15. (Original) The apparatus of claim 1, wherein the plasma generator is a solid state plasma generator without any moving parts and capable of short tuning response time.
16. (Original) The apparatus of claim 1, wherein the plasma generator is a solid state plasma generator employing frequency tuning to achieve output matching.
- 17.-20. (Cancelled)
21. (Previously amended) The apparatus of claim 1, wherein the helical ribbon electrode further comprises a cylindrical helix that forms a plurality of spiral turns in different planes.
22. (Previously presented) The apparatus of claim 21, wherein the spiral turns are essentially similar in size.
23. (Previously amended) The apparatus of claim 1, wherein the helical ribbon electrode has an elongated cross-section.
24. (Previously amended) A multi-layer processing chamber, comprising:
a gas source coupled to the chamber for introducing a processing gas into a reaction chamber, the reaction chamber having a sample disposed therein;

TEGL-01165US0

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a solid state radio frequency plasma source coupled to the chamber to excite the processing gas;

a helical ribbon electrode adapted to excite the plasma, the helical ribbon electrode comprising a plurality of ribbon coils stacked in flat concentric spirals, each said ribbon coil having a width and a thickness, said width being greater than the thickness, said width being substantially perpendicular to the thickness, and said width being in a dimension facing an adjacent coil; and

a controller coupled to the solid state radio frequency plasma source to pulse the solid state radio frequency plasma source for each layer deposited on the sample.

25. (Previously amended) The apparatus of claim 1, wherein the width of the ribbon coils is substantially greater than the thickness of the ribbon coils.
26. (Previously amended) The apparatus of claim 1, wherein the ratio of the thickness to the width ranges up to 1:10,000.
27. (Previously amended) The apparatus of claim 24 wherein each of said plurality of ribbon coils has a width and a thickness, wherein the width is greater than the thickness.
28. (Previously amended) The apparatus of claim 24, wherein each of said plurality of ribbon coils has a width and a thickness, said width being substantially greater than the thickness.
29. (Previously amended) The apparatus of claim 24, wherein the ratio of the thickness to the width ranges up to 1:10,000.
30. (Previously presented) An improved apparatus for semiconductor processing, the improvement comprising a helical ribbon electrode, wherein the helical ribbon electrode comprises a compressed cylindrical helix having a plurality of flat concentric spiral coils separated from each other by a sheet of dielectric material, each said flat concentric spiral coil comprising a ribbon-like form, said ribbon-like form comprising a width and a thickness wherein the width is substantially greater than the thickness, the width lying in a plane that faces another of said plurality of flat concentric spiral coils, and the thickness corresponding to a plane that is substantially parallel to a direction of stacking of said plurality of flat concentric spiral coils.

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31. (Previously presented) An improved apparatus for semiconductor processing, the improvement comprising a helical ribbon electrode, wherein the helical ribbon electrode comprises a plurality of ribbon-shaped coils, each said coil being substantially wider than each said coil is thick, where a width corresponds to a plane that faces another of said plurality of ribbon-shaped coils, and a thickness corresponds to a plane that is substantially perpendicular to the width.
32. (Previously presented) An apparatus for semiconductor processing, the apparatus comprising:
- a process chamber;
 - a solid state RF plasma generator coupled to the process chamber to excite a processing gas and generate a plasma;
 - a controller coupled to the solid state RF plasma generator to pulse the solid state radio frequency plasma generator for each deposited layer; and
 - a cylindrical helical ribbon electrode coupled to an output of the solid state radio frequency plasma generator, the cylindrical helical ribbon electrode further comprising:
 - a plurality of spirally-connected ribbon-shaped coils, each said coil having a width and a thickness;
 - the width substantially greater than the thickness and flat in a dimension facing another of said plurality of spirally-connected ribbon-shaped coils; and
 - the thickness is substantially perpendicular to the width,
- wherein the cylindrical helical ribbon electrode is adapted to be placed within five inches of a sample situated in the process chamber.
33. (Previously presented) The apparatus of claim 32 wherein the cylindrical helical ribbon electrode is situated in an interior of the process chamber.
34. (Previously presented) The apparatus of claim 32 wherein the cylindrical helical ribbon electrode is situated on an exterior of the process chamber.

35. (Previously presented) The apparatus of claim 32 wherein the a sheet of dielectric material separates adjacent said spirally-connected ribbon-shaped coils so that, when compressed, the adjacent surfaces of the spirally-connected ribbon-shaped coils do not touch.
36. (Previously presented) The apparatus of claim 35 wherein a width of the dielectric sheet is greater than the width of the spirally-connected ribbon-shaped coils.
37. (Previously presented) An improved electrode for coupling to the output of a generator, the improvement comprising a helical ribbon electrode further comprising:
- a plurality of substantially flat, concentric, spirally-connected coils, said coils having a width and a thickness, the width being in a dimension facing an adjacent coil, and the thickness being perpendicular to the width, where the width is substantially greater than the thickness.
38. (Previously presented) An improved electrode for coupling to the output of a generator, the improvement comprising a helical ribbon electrode further comprising:
- a plurality of substantially flat, concentric, spirally-connected coils, said coils having a width and a thickness, the width being in a dimension facing an adjacent coil, and the thickness being perpendicular to the width, where the width is substantially greater than the thickness; and
 - a sheet of dielectric material between adjacent coils.